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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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05/27/2005

Hong-Seok Seo

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EXAMINER

STEVENS, BRIAN J

ART UNIT

PAPER NUMBER

2611

MAIL DATE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/536,755	<b>Applicant(s)</b> SEO ET AL.	
	<b>Examiner</b> Brian J. Stevens	<b>Art Unit</b> 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 May 2007 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 3-5, 7-11 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the method steps to determine the bit preceding it, thus changing the method of determining the bit at hand. The option of choosing alpha or beta for the subsequent steps is dependent upon on the choice of alpha or beta in the bit preceding it. Once the first bit is chosen and the signal path is determined, that signal path has to be used for the subsequent bit determination, the claims stated lack that essential step.

The term "type" in claims 2, 6, 7, 8, and 9 is a relative term which renders the claim indefinite. The term "type" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Since it is stated in the specification that that type depends on which incoming signal is first chosen, thus changing what path to continue on to determine the remaining bits and using a specific "type".

### ***Drawings***

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include reference character(s) within Figure 12 and Figure 13 not mentioned in the description. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by US 6,236,685 B1 by Oppedahl.

Regarding claim 1, Oppedahl teaches in a hard decision demodulation method of QAM (Quadrature Amplitude Modulation) mode (See Column 13, Lines 5-10),

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characterized in that it includes determining in bit unit, a corresponding symbol value (See column 1, Lines 57-63) from a quadrature phase component value and an in-phase component value of a received signal (See Column 11, Lines 31- 33).

Regarding claim 12, Oppedahl teaches in a hard decision demodulation apparatus of QAM (Quadrature Amplitude Modulation) (See Column 13, Lines 5-10) mode, characterized in that it includes a hard decision determining portion of determining in bit unit (See Column 11, Lines 31-33), a corresponding symbol value from a quadrature phase component value and an in-phase component value of a received signal (See Column 1, Lines 57-63).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,236,685 B1 by Oppedahl in view of US 2004/0181569 A1 by Attar et al.

Regarding claim 2, Oppedahl taught the method of claim 1 as described above, but does not teach characterized in that, the decision method of the first bit of the first type selects one of the received values, and determines that output is a or else b, if the value is greater than or equal to 0, wherein a is a receive value of I (a real number

portion) channel, B is a receive value of Q(an imaginary number portion) channel, and a and b is any number discriminated from each other. Attar teaches the knowledge of comparing the incoming signal to a threshold determined to be any number, IE 0, and output a number that is discriminated from each other as a and b, (See Paragraph [0138], "If an energy corresponding to a bit is greater than the threshold, the bit is assigned a first value, e.g., '1', otherwise the bit is assigned a second value, e.g., '0'), is well known in the art.

It would have been obvious to one of ordinary skill in the art having the teachings of Oppedahl and Attar before them at the time the invention was made to modify the method of Oppedahl to further include having a decision of the first bit be determined by exceeding or equal to a threshold to determine an arbitrary output bit that is different from the not exceeding output bit. Taking either the I or the Q component of the incoming signal as taught by Oppedahl and comparing it to any threshold would first map the bit in a certain quadrant for the constellation. One of ordinary skill in the art would therefore have been motivated to make the modification so that constellation can be first determined which of the quadrants the bit would be mapped to determined by the signal overcoming the threshold value.

Regarding claim 6, Oppedahl taught the method of claim 1 as described above, but does not teach in that the decision method of the first bit of the second type selects one of the received values, and determines that output is a or else b, if the value is less than 0, wherein it is a receive value of I (a real number portion) channel, B is a receive

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value of Q (an imaginary number portion) channel, and a and b is any number discriminated from each other. Attar teaches the knowledge of having a signal compared to a threshold to determine the first bit output, (See Paragraph [0138], "If an energy corresponding to a bit is greater than the threshold, the bit is assigned a first value, e.g., `1`, otherwise the bit is assigned a second value, e.g., `0`. If the value of the number is greater than a threshold, then a value would be given, thus if it less than a threshold a different value would be given.), is well known in the art.

It would have been obvious to one of ordinary skill in the art having the teachings of Oppedahl and Attar before them at the time the invention was made to modify the method of Oppedahl to further include having a decision of the first bit be determined by exceeding or equal to a threshold to determine an arbitrary output bit that is different from the not exceeding output bit. Taking either the I or the Q component of the incoming signal as taught in Oppedahl and comparing it to any threshold would first map the bit in a certain quadrant for the constellation. One of ordinary skill in the art would therefore have been motivated to make the modification so that constellation can be first determined which of the quadrants the bit would be mapped to determined by the signal overcoming the threshold value.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 5,315,617 by Guida et al, Figure 4a.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Stevens whose telephone number is (571)270-3623. The examiner can normally be reached on M-F 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BS  
Brian Stevens

/David C. Payne/

Supervisory Patent Examiner, Art Unit 2611